

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT(S): Vestal
SERIAL NO.: Continuation of U.S. Serial No. 09/038,324
FILED: January 4, 2001
TITLE: MASS SPECTROMETER SYSTEM AND METHOD FOR MATRIX-
ASSISTED LASER DESORPTION MEASUREMENTS
GROUP NO.: 1743 (Prior Application)
EXAMINER: A. Soderquist (Prior Application)

Assistant Commissioner for Patents
BOX REISSUE
Washington, D. C. 20231

PRELIMINARY AMENDMENT

Sir:

Please enter this Preliminary Amendment for the above-identified continuation reissue application prior to calculating the filing fee. Enclosed herewith is a copy of a Petition for Extension of Time for the immediately prior co-pending reissue application, i.e., U.S. Serial No. 09/038,324, which extended the pendency of the immediately prior reissue application at least until January 4, 2001.

AMENDMENT

To the Specification

Please amend the specification by inserting after the title of the invention and before "FIELD OF THE INVENTION" the following.

--Note that more than one reissue application has been filed. This application is a continuation of reissue application Serial No. 09/038,324, filed on March 11, 1998, the entire content of which is incorporated by reference herein.--

To the Claims

Please cancel without prejudice original claims 2-74.

REMARKS

Applicants file this continuation reissue application based on co-pending reissue application Serial No. 09/038,324. Claims 1-74 issued in the original patent. Applicants cancel without prejudice claims 2-74. Accordingly, after entry of this Amendment, claim 1 will be pending and claims 2-74 cancelled without prejudice. Applicants intend to submit a Supplementary Preliminary Amendment prior to the first substantive examination of this application.

To the Specification

Applicants amend the specification as required by 37 C.F.R. 1.177(a) to provide notice that more than one reissue application has been filed along with the appropriate identification of the other reissue application. Applicants submit no new matter is introduced by this amendment.

Applicants also amend the specification as previously done in the immediately prior reissue application (a copy of which was filed in this case), to correct spelling, typographical and/or grammatical errors. See the copy of the application as filed with the handwritten amendments in columns 4, 7, 9, 12 and 13, and in the abstract. Applicants submit that no new matter is introduced by these amendments.

To the Claims

Applicants cancel without prejudice claims 2-74. Accordingly, after entry of this Amendment, claim 1 will be pending.

It is noted that the original reissue application, of which this application is a continuation thereof, was filed with new claims 75-103. Because Applicants intend to submit a Supplementary Preliminary Amendment prior to the first substantive examination of this application to introduce new claims, claims 75-103 filed with the prior application were not filed with this application as they were not part of the original issued patent upon which subsequent amendments are based.

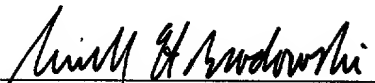
If the Patent Office has any questions with respect to this continuation reissue

application, it is invited to contact the undersigned.

Respectfully submitted,

Date: January 4, 2001

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PATENT

Atty. Docket No. SYP-060REC/N

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT(S): Vestal

SERIAL NO.: 09/755,951

ART UNIT: 1743 (prior appl'n)

FILING DATE: March 16, 2000

EXAMINER: A. Soderquist (prior appl'n)

TITLE: MASS SPECTROMETER SYSTEM AND METHOD FOR
MATRIX-ASSISTED LASER DESORPTION MEASUREMENTS**Box MISSING PARTS**Assistant Commissioner for Patents
Washington, D.C. 20231**SUPPLEMENTAL PRELIMINARY AMENDMENT**

Sir:

In response to a Notice to File Missing Parts of Reissue Application mailed from the U.S. Patent Office on February 5, 2001, Applicant submits this Supplemental Preliminary Amendment. Applicant submits herewith a single-sided copy of the specification and claims of the originally issued patent in double column format, an Information Disclosure Statement and Form PTO-1449, and a copy of a Substitute Reissue Oath/Declaration of Sole Inventor from the immediately prior reissue application, i.e., U.S. Serial No. 09/038,324. Applicant also submits a check in the amount of \$840.00 to cover the basic filing fee and surcharge for the late filing fee.

Claim 1 is pending. Claims 2-74 were previously canceled without prejudice. Applicant cancels without prejudice claim 1. Applicant introduces new claims 75-94. Consequently, claims 75-94 will be pending for examination after entry of this Amendment.

AMENDMENT**To the Claims**

Please cancel without prejudice claim 1.

Please add new claims 75-94 as follows.

75. A system for obtaining mass data comprising:

a mass spectrometer comprising an ion source chamber, wherein the ion source chamber comprises

a sample receiving stage adapted to support a sample support, and

a mechanism to move the sample receiving stage in an x direction and in a y direction perpendicular to the x direction, wherein the x direction and the y direction lie substantially in the same plane;

a laser source in optical communication with the ion source chamber, wherein the laser source is adapted to provide a laser pulse to a sample support in the ion source chamber;

a vacuum lock chamber connected with the ion source chamber, wherein the vacuum lock chamber comprises a sample support holder adapted to support more than one sample support;
and

a sample support transfer mechanism adapted to:

(a) disassociate a first sample support from the sample receiving stage, transport the first sample support from the ion source chamber to the vacuum lock chamber and to associate the first sample support with the sample support holder; and

(b) disassociate a second sample support from the sample support holder, transport the second sample support from the vacuum lock chamber to the ion source chamber and to associate the second sample support with the sample receiving stage;

wherein the vacuum lock chamber and ion source chamber are in fluid communication and are maintained under a vacuum controlled environment during disassociation, transportation and association of the first and second sample supports.

76. The system of claim 75 further comprising an electronic control mechanism to control at least the mechanism to move the sample receiving stage.

77. The system of claim 76 wherein the electronic control mechanism comprises a computer.

78. The system of claim 75 wherein the laser source is adapted to provide a laser pulse to irradiate a sample on a sample support.

79. The system of claim 75 wherein the sample support holder comprises a cassette adapted to hold a plurality of sample supports.

80. The system of claim 75 further comprising a sample support.

81. The system of claim 80 wherein the sample support comprises a plurality of samples each disposed at fixed locations on the sample support.

82. The system of claim 81 wherein the sample support further comprises a location identifier associated with at least one of the fixed locations.

83. The system of claim 75 further comprising a door member positioned between the ion source chamber and the vacuum lock chamber.

84. The system of claim 75 further comprising a vacuum pump independently associated with the vacuum lock chamber.

85. The system of claim 75 further comprising a sample preparation system associated with the vacuum lock chamber, wherein the sample preparation system is adapted to deliver a plurality of samples to a sample support prior to introduction to the vacuum lock chamber.

86. The system of claim 85 wherein the sample preparation system comprises a sample loading mechanism adapted to position each of a plurality of liquid samples on a sample support.

87. The system of claim 86 wherein the sample preparation system further comprises a sample curing chamber to dry each of the plurality of liquid samples on a sample support.

88. The system of claim 75 further comprising a sample storage chamber connected to the vacuum lock chamber, wherein the sample storage chamber comprises a sample support storage holder adapted to support at least one sample support.

89. The system of claim 88 further comprising a sample support storage transfer mechanism adapted to move a sample support from the sample storage chamber to the vacuum lock chamber.

90. A system for obtaining mass data comprising:
a mass spectrometer comprising an ion source chamber, wherein the ion source chamber comprises

a sample receiving stage adapted to support a sample support, and
a mechanism to move the sample receiving stage;

a laser source in communication with the ion source chamber, wherein the laser source is adapted to provide a laser pulse to a sample support in the ion source chamber;

a vacuum lock chamber connected with the ion source chamber;

a sample storage chamber connected to the vacuum lock chamber, wherein the sample storage chamber comprises a sample support holder adapted to support at least one sample support; and

a sample support transfer mechanism adapted to:

(a) disassociate a first sample support from the sample receiving stage, transport the first sample support from the ion source chamber to the vacuum lock chamber and to associate the first sample support with the sample support holder; and

(b) disassociate a second sample support from the sample support holder, transport the second sample support from the vacuum lock chamber to the ion source chamber and to associate the second sample support with the sample receiving stage;

wherein the vacuum lock chamber and ion source chamber are in fluid communication and are maintained under a vacuum controlled environment during disassociation, transportation and association of the first and second sample supports.

91. The system of claim 90 wherein the mechanism to move the sample receiving stage is adapted to move the sample receiving stage in an x direction and in a y direction perpendicular to the x direction.

92. A method of obtaining mass data comprising the steps of:
supporting each of a plurality of samples at a fixed location on one of a plurality of sample supports;
providing an ion source chamber having a sample receiving stage adapted to support a sample support;
providing a vacuum lock chamber adapted to maintain one or more of the sample supports within a vacuum controlled environment while a sample on another of the sample supports is struck by a laser pulse,
wherein the vacuum lock chamber comprises a sample support holder adapted to receive the plurality of sample supports;
moving a first sample support associated with the sample receiving stage within the ion source chamber in an x direction and in a y direction perpendicular to the x direction;
striking with a laser pulse a desired number of the plurality of samples on the first sample support within the ion source chamber to desorb and ionize sample molecules;
disassociating the first sample support from the sample receiving stage;
transporting the first sample support from the ion source chamber to the vacuum lock chamber;
associating the first sample support with the sample support holder;
disassociating a second sample support from the sample support holder;
transporting the second sample support from the vacuum lock chamber to the ion source chamber;
associating the second sample support with the sample receiving stage;
moving the second sample support associated with the sample receiving stage within the ion source chamber in an x direction, and in a y direction perpendicular to the x direction; and
striking with a laser pulse a desired number of the plurality of samples on the second sample support within the ion source chamber to desorb and ionize sample molecules.

93. The method of claim 92 wherein the vacuum lock chamber and ion source chamber are in fluid communication and are maintained under a vacuum controlled environment during the dissociating, transporting, and associating of the first and second sample supports.

94. The method of claim 92 further comprising the step of:
recording in a computer mass data corresponding to at least one of the plurality of samples struck with a laser pulse.

REMARKS

Claim 1 is pending. Claims 2-74 were previously canceled without prejudice. Applicant cancels without prejudice claim 1. Applicant introduces new claims 75-94. Consequently, claims 75-94 will be pending for examination after entry of this Amendment. Applicant submits that no new matter is introduced by the new claims and that claims 75-94 are in condition for allowance.

Support for New Claims

Support for new independent claim 75 is found throughout the disclosure of the issued patent. In particular, support for new claim 75 is found at least at column 4, line 12; column 6, lines 53-57; column 8, lines 21-28 and 40-43; column 9, lines 39-45, 53-58 and 61-64; column 10, lines 7-12; and in Figures 6, 7 and 9.

Support for new independent claim 90 is found throughout the disclosure of the issued patent. In particular, support for new claim 90 is found at least at column 3, lines 14-17 and 22-34; column 4, lines 12 and 35-38; column 6, lines 44-64; column 7, lines 11-22 and 37-55; column 8, lines 1-5 and 53-66; column 9, lines 53-58 and 61-64; column 10, lines 7-12; and in Figures 4-9.

Support for new independent claim 92 is found throughout the disclosure of the issued patent. In particular, support for new claim 92 is found at least in the above cites for new claim 75, and at column 3, lines 22-34; column 4, lines 9-13 and 35-38; column 6, lines 52-65; column 7, lines 11-15 and 37-41; column 8, lines 53-64; column 9, lines 3-13 and 30-50; column 9, line 30 to column 10, line 12; and in Figures 4-9.

Applicant introduces new dependent claims 76-89 which depend directly or indirectly from new independent claim 75. Support for these new dependent claims is found throughout the disclosure of the issued patent. In particular, support for these new dependent claims is found at least at column 1, lines 59-62; column 3, lines 11-34; column 3, line 59 to column 4, line 27; column 4, lines 35-38; columns 5, lines 29-39; column 5, line 61 to column 6, line 4; column 6, lines 19-26 and 44-64; column 7, lines 5-7, 37-41 and 50-56; column 8, lines 1-5, 16-28, 40-43 and 53-58; column 9, lines 3-19 and 29-64; column 10, lines 3-12; and in Figures 6, 7 and 9.

Applicant introduces new dependent claim 91 which depends from claim 90. Support for this new dependent claim is found throughout the disclosure of the issued patent. In particular, support for this new dependent claim is found at least at column 4, lines 35-38; column 9, lines 53-57 and 61-64; and in Figure 9.

Applicant introduces new dependent claims 93 and 94 which depend directly from claim 92. Support for these new dependent claims is found throughout the disclosure of the issued patent. In particular, support for these new dependent claims is found at least at column 1, line 62 to column 2, line 1; column 12, line 48 to column 13, line 12; column 7, lines 49-55; and column 8, lines 21-28.

Remarks with Respect to Previously Applied References

Applicant submits that new claims 75-94 are patentable over all previously cited prior art and are in condition for allowance. Nevertheless, Applicant provides the following remarks with respect to references applied in prior Office actions in connection with the parent reissue application, i.e., U.S. Serial No. 09/038,324.

New independent claims 75 and 90 generally recite a system for obtaining mass data which includes a mass spectrometer having an ion source chamber, and a vacuum lock chamber connected to the ion source chamber. The ion source chamber includes a sample receiving stage adapted to support a sample support, and a mechanism to move the sample receiving stage. In claim 75, the mechanism moves the sample receiving stage in an x direction and a y direction perpendicular to the x direction, where the x and y directions lie substantially in the same plane. The claimed system further includes a sample support holder adapted to support more than one

sample support, thereby permitting multiple sample supports to be associated with the vacuum lock chamber.

The claimed system also includes a sample support transfer mechanism. The sample transfer mechanism shuttles sample supports between the vacuum lock chamber and the ion source chamber. The transfer mechanism is adapted to exchange a sample support in the ion source chamber with a different sample support associated with the sample support holder. The exchange of sample supports occurs without having to isolate the vacuum chamber from the ion source chamber. That is, during the sample support exchange, the vacuum chamber and ion source chamber are in fluid communication and both are maintained under a vacuum controlled environment.

Applicant submits that none of the references applied in prior Office actions of the parent reissue application teaches or suggests a transfer mechanism that exchanges sample supports without isolating a vacuum lock chamber from an ion source chamber. For example, in references where sample support transfer between a vacuum lock chamber and an ion source chamber is taught or suggested, a valve, such as a sluice-lock or ball valve, typically isolates the chambers from each other while one sample support is exchanged for another.

More specifically, in Klaus et al., "A New UHV-Specimen Preparation Chamber for Solid Surface Analysis with Sample Transport Mechanism Over a UHV-Sluice Lock to a SIMS-Apparatus," Proc. 7th Intern. Vac. Congr. & 3rd Intern. Conf. Solid Surfaces, Vienna (1977), due to the design of the apparatus, it appears that the specimen carrier is removed from the ion source chamber into the preparation chamber and the sluice lock is closed so that another specimen carrier can be introduced into the preparation chamber while it is at atmospheric pressure. That is, it appears that the preparation chamber does not permit a "new" specimen carrier to be ready and waiting to be exchanged with the specimen carrier in the ion source chamber so that fluid communication and a vacuum controlled environment are maintained in the preparation chamber and the ion source chamber during the exchange.

In addition, U.S. Patent No. 5,382,793 to Weinberger et al. states that "[w]hen no tip is inserted through canal 170, ball valve 172 isolates sample chamber 28 from vacuum chamber 22" ('793 patent, col. 9, lns. 12-14). Accordingly, it appears that when a tip (sample support) is withdrawn from the ion source chamber, the ball valve is closed, isolating the vacuum lock

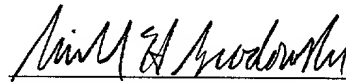
chamber from the ion source chamber prior to introduction of another tip into the ion source chamber. Thus, neither of the above references teaches or suggests an apparatus that does not require the above-described isolation.

Based in part on the above remarks, Applicant respectfully submits that independent claims 75 and 90 are free of the previously cited prior art and are in condition for allowance. Because Applicant submits that each of the independent claims is in condition for allowance, Applicant also submits that each of dependent claims 76-89 and 91 is in condition for allowance.

CONCLUSION

Based on the above remarks, Applicant submits that new claims 75-94 are in condition for allowance and respectfully request entry as such. If it is believed that a telephone conversation with Applicant's attorney would be helpful in expediting prosecution of this application, the Examiner is invited to contact the undersigned.

Respectfully submitted,



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